

REMARKS

Claims 1, 2 and 3 have been amended to clarify the claim limitations.

Claims 4-13 are added. No new matter is added.

Claims 1-13 are pending in the subject application. Claim 3 is rejected under 35 U.S.C. § 112 as being indefinite. "Claims" are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 3,696,259 ("*Mori*"). Reconsideration and withdrawal of the rejections is solicited.

OFFICE ACTION

On the Office Action Summary, the Examiner indicated that Claims 1-3 are pending and subject to a restriction and/or election requirement and did not indicate the claims were rejected, allowed or objected to. In the body of the Office Action, it appears that the Examiner conducted a substantive examination which is not indicated on the Summary.

BACKGROUND

The present application is directed to a high capacity composite oscillating device. The conventional composite oscillating device induced a composite flexure oscillating body with two driving vertical transducers positioned orthogonal to one another. One problem with the prior art systems was that achievement of a high capacity vibration energy of a flexure oscillation rod was not possible.

PRESENT APPLICATION

The pending claims are directed to a high capacity composite oscillating device wherein n sets of bolt-tightened Langevin-type ultrasonic transducers

(BLTs) with identical characteristics are positioned at regular intervals on an outer periphery portion of a disk-shaped oscillating body. The opposed BLTs are driven in an opposite phase mode respectively and the adjacent BLTs are driven in an oscillating mode in which the phase is shifted by π/n . As a result, the disk-shaped oscillating body has a center which serves as an oscillation loop, i.e. a rotational oscillation state, depicted for example at Figure 3, induced by the composite oscillations generated by the vector sum of the phase shifted oscillations of the n sets of BLTs. The center portion of the disk-shaped oscillating body induces a high capacity composite oscillation output, to thereby obviate the deficiencies in the prior art. Furthermore, by connecting the center of the disk-shaped oscillating body to a loop segment of oscillation of an oscillating rod, a high capacity composite oscillation output can be obtained from an end of the oscillating rod, further obviating the deficiencies in the prior art. Still further, the device recited in the pending claims generates composite oscillations in a direction orthogonal to a center longitudinal axis of the oscillation rod and at an end surface of the oscillation rod.

CITED ART

Mori, et al., U.S. Patent No. 3,696,259 ("*Mori*") is not directed at the same type of device as the Applicant's claimed invention or as the prior art disclosed in the Background section. First, with reference to Figures 14-17, *Mori* drives two or more oscillators 1 in-phase and in a radial direction of the disk-shaped oscillating bodies 30 and 31. *Mori* does not phase shift the oscillating modes driving the oscillators. As a

result, each of the disk-shaped oscillating bodies have a center which serves as an oscillation node, i.e. a stationary oscillation state induced by the composite oscillations generated by the vector sum of the converging in-phase oscillations of the n sets of oscillators. Second, a direction of vertical oscillations that are in-phase in the radial direction of the disk-shaped oscillating bodies is changed at a center of the disk-shaped oscillating bodies. Vertical oscillations along a center longitudinal axis of the disk-shaped oscillating bodies occur at an end of a transmission element 33 or a plug 41 and a die 42. Thus, *Mori* is directed at a completely different type of composite oscillating device with a wholly different oscillation state at the tip section of the oscillators, whether the center of the disk-shaped oscillating bodies, the transmission element or the die.

THE PRESENT REJECTIONS

§112 REJECTION

In the outstanding Office Action, the Examiner rejected Claim 3 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention and specifically for the use of “confusing language.”

The Applicant has amended Claim 3 to correct the informalities identified by the Examiner. Reconsideration and withdrawal of the rejection of Claim 3 under 35 U.S.C. § 112 is respectfully solicited.

§102 REJECTION

In the outstanding Office Action, the Examiner rejected “Claims” as being anticipated by *Mori* although it is not entirely clear which claims the Examiner is

discussing since he does not identify individual claims. For at least the reasons discussed below, Applicant respectfully requests the anticipatory rejections be withdrawn.

Mori fails to disclose each and every element of independent Claims 1 and 3 as amended and as such the Applicant respectfully requests the withdrawal of the rejection of these claims and those claims dependent thereon under 35 U.S.C. § 102(b).

Both independent claims require: “**n phase shifters for shifting the phase of an input to said n sets of BLTs by π/n .**” Thus, as claimed, the use of n phase shifters provide for the driving of opposed BLTs in an opposite phase mode respectively and adjacent BLTs in an oscillating mode in which the phase is shifted by π/n to cause composite oscillations to occur at the center portion of the disk-shaped oscillating body as an oscillation loop and to obviate the problem identified in the prior art.

Furthermore, both independent claims require “**a disk-shaped oscillating body having a center which serves as an oscillation loop.**” Thus, as claimed, composite oscillations occurring at the center of said disk-shaped oscillating body, or at an end of said oscillating rod, track said oscillation loop.

Mori does not disclose the above mentioned limitations, but instead *Mori* teaches away from these limitations. For example, *Mori* does not teach, suggest or make any reference whatsoever to the claimed phase shifters for shifting the phase of an input to the sets of oscillators. Rather, *Mori* teaches the oscillators are driven in phase in a radial direction of the oscillating bodies.

Further, by way of example, *Mori* fails to disclose that the claimed disk shaped

oscillating body has a center which serves as an **oscillation loop**. Rather, *Mori* discloses the disk-shaped oscillating bodies have a center which serves as an **oscillation node** as the oscillators are driven in-phase in a radial direction of the oscillating bodies. At least at Col. 5, ll. 25-26 and 55-57, *Mori* discloses using circular flanges for “convergence instead of divergence” of vibratory energy. Additionally, at least in the Abstract, Figures 14 and 17 and at Col. 1, ll. 13-24, *Mori* discloses that the vibratory energy is converged to an oscillation node at the junction of the elements or the circular flange with transducers fixed in holes about the outer periphery of the flange.

Still further, *Mori* does not teach the features of new dependent claims 8 and 13, namely that said composite oscillations occurring at an end of said oscillation rod are “in a direction orthogonal to a center longitudinal axis of said oscillation rod.” At least at Col. 5 ll. 35-59, *Mori* discloses that a direction of vertical oscillations, that are in-phase in the radial direction of the disk-shaped oscillating bodies, is changed at a center of the disk shaped oscillating bodies to a direction along a center longitudinal axis of the transmission element or the die. *Mori* makes no teaching or suggestion whatsoever of any piece comprising the features recited in Claims 8 and 13.

As *Mori* fails to disclose at least each of the above limitations in the amended claims, the Examiner’s rejection of the claims as anticipated is improper. The Applicant further submits that it would not be obvious to one skilled in the art, given the teachings of *Mori* before him, to combine each of the claimed limitations because *Mori* is directed to a completely different device that does not use phase shifters or shift the phase of the inputs to n sets of bolt-tightened Langevin-type ultrasonic transducers by π/n .

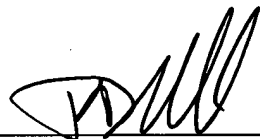
For at least the above reasons, reconsideration and withdrawal of the rejection of independent claims 1 and 3, as amended, is requested. The remaining claims are patentable by virtue of their dependency upon independent Claims 1 and 3 alone and without regard to the further patentable limitations respectively recited therein.

CONCLUSION

Applicant respectfully submits that Claims 1-13 are in condition for allowance. Accordingly, an early and favorable reconsideration of this application is respectfully requested.

The Office is requested and authorized to charge any fee associated with this application to Deposit Account No. 04-1679 to Duane Morris LLP.

Respectfully submitted,



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